October 1976

423

U.S. Soil Conservation

U.S. Department of Agriculture

EASTERN MICHIGAN UNIVERSITY
LIBRARY
DEC 2 1976
SCIENCE & TECHNOLOGY

Drying Out Chicago 4

Teton Dam Diary 7

Creeping Islands 12

Conservation on the Half Shell 20

LIBRARY
EASTERN MICHIGAN UNIVERSITY
YPSILANTI
U. S. DEPOSITORY DOCUMENT

DEC 1 1976

From the Administrator

The Sound of Conservation

Thanks mainly to the clock radio and car radio, the medium of radio has not only survived the TV age, but it has actually gotten bigger, both in number of stations and total audience. Millions of people every day wake up to radio, listen to it while driving back and forth to work, and, if they are teenagers, even go to sleep with it.

The Soil Conservation Service uses radio to talk to the American public about soil and water conservation. Each week our field people, district supervisors, and cooperators participate in an untold number of broadcasts, many of them farm shows. USDA's Office of Communication sends out more radio materials, many of them interviews with conservationists.

In addition, SCS issues, from time to time, recordings of short "public service announcements," or PSA's, which are played without charge by local stations. The discs, each containing 8 or 10 assorted PSA's, are distributed by district conservationists, who personally deliver them to local radio stations.

The act of handing over a disc serves two useful purposes. First, it brings our PSA's directly to the attention of station managers, who might otherwise fail to listen to them. Second, it gives the district conservationist a chance to get acquainted with station personnel and to explore the possibilities of other programs.

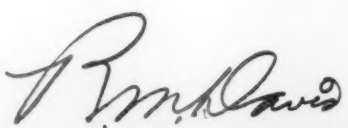
This month a new disc of eight 30-second PSA's is being mailed to field offices. It should be delivered promptly; a second disc is already in production and will be mailed right after Christmas.

Like many of our earlier PSA's, some of the new ones are humorous, to catch the ear of disc jockeys and listeners. However, the messages they contain are serious. They include: (1) help preserve prime farmland for agriculture; (2) check the soil survey before you buy or build; (3) increase wildlife with conservation practices; and (4) do something now to stop soil erosion and improve the environment.

A number of the new spots mention conservation districts as well as SCS.

Once again, our "voice of conservation" is Bill Hart, a long-time friend of districts who is an announcer for Station WCAU in Philadelphia.

We hope through continued use of radio to tell millions of Americans about the merits of conservation, including many people who might not otherwise learn about soil erosion and our programs to combat it.



October 1976, Vol. 42, No. 3

Soil Conservation

Soil Conservation is the official magazine of the Soil Conservation Service. The Secretary of Agriculture has determined that publication of this periodical is necessary in the transaction of public business required by law of this Department. Use of funds for printing *Soil Conservation* has been approved by the Director of the Office of Management and Budget through July 31, 1978.

John A. Knebel
Acting Secretary of Agriculture

R. M. Davis, Administrator
Soil Conservation Service

Prepared in the Division of Information, Soil Conservation Service, U.S. Department of Agriculture, Washington, D.C. 20250

Diana Morse
Editor

Maryellen Bertram
Editorial Assistant

Christopher Lozos
Design Consultant

Reprint permission
Contents of this magazine may be reprinted without special permission. Credit is not required but is appreciated. Photos available on request.

Commercial names
Mention of commercial enterprises or brand names does not constitute endorsement or imply preference by the Department of Agriculture.

Subscriptions
$6.85 per year, $8.60 foreign. Single copy, 55 cents. Discount of 25 percent on orders of 100 or more sent to the same address. Order direct from:

Superintendent of Documents, Government Printing Office, Washington, D.C. 20402.

Cover:
Virginia's barrier islands are one of the natural areas in which the Soil Conservation Service is assisting The Nature Conservancy in ecological studies. See story on page 12.

Contents

From the Administrator 2

Chicago's New Flood Control Study 4

The Days After Teton 7
Richard J. Gooby

Preserving Virginia's Barrier Islands 12
Anne Zack

Yesterday's Barrier Islands 18
Maria Ann Graham

Consider the Oyster 20
Bernhardt Rufener and Richard Murakami

Title X Teamwork 22
Robert K. Kissler

New Publications 23

Meetings 23

LIBRARY
EASTERN MICHIGAN UNIVERSITY
YPSILANTI
U. S. DEPOSITORY DOCUMENT

DEC 1 1976

Chicago's New Flood Control Study

A recently completed flood protection study for the Chicago metropolitan area emphasizes nonstructural measures and includes imaginative structural designs. One of two all-urban river basin studies in the country, it is designed to control flooding that causes more than $6 million in damages a year—a figure expected to double by the year 2000 unless action is taken.

Faced with steadily increasing floodwater hazards, the Chicago metropolitan area has launched a program to protect more than 11,000 homes and save millions of dollars annually in flood damages.

Its Chicago metropolitan area floodwater management study specifies improvements—some already underway—to reduce overbank flooding by 90 percent in the 1,142-square-mile Chicago river basin area.

"When the plans in the study are fully implemented, the impact will be tremendous," said Daniel E. Holmes, SCS state conservationist in Illinois. "They will offer 100-year-frequency flood protection to more than 11,000 homes and nearly 500 businesses. They will yield annual flood control benefits of more than $10 million, plus about $2 million in recreation benefits."

Holmes spoke at dedication ceremonies for the study last June at its first floodwater retarding structure, Busse Woods Reservoir, already half completed.

The Chicago metropolitan area floodwater management plans are the result of a 5-year cooperative river basin study under the leadership of the Soil Conservation Service. More than 100 organizations and units of local, state, and federal government have participated in the study, which was requested by the Metropolitan Sanitary District of Greater Chicago (MSDGC).

The floodwater management plans contain both environmental and economic goals. They emphasize nonstructural flood control measures and imaginative designs for structural measures.

For example, nearly 5,000 acres of wetlands and more than 3,300 acres of stream corridors will be preserved. Recent urban development of these natural floodwater storage areas is one cause of Chicago's increasing flood problem.

State and local governments have enacted stringent regulations on further building and development on the flood plain. Already a mobile home park has been relocated out of the flood plain, and businesses are moving to less susceptible locations.

Other nonstructural measures are: floodproofing more than 475 buildings, controlling erosion on more

than 100,000 acres of agricultural land and 5,000 acres of land under development, and protecting more than 10,000 acres of upland forest.

Structural plans call for 28 reservoirs capable of storing 12.6 billion gallons of floodwater. Because this urban area has few suitable sites for dams, however, many of these reservoirs will be dugouts or abandoned sand and stone quarries. The largest will be 20 surface acres and 150 feet deep. The excess water will flow into the dugout and quarries and be pumped out after the danger of flooding has passed.

The larger reservoirs will also be used for recreation. One deep limestone quarry, for instance, will become the main attraction for a park. It will be partly filled with spoil from the dugouts and will be maintained with enough water for fishing, boating, and swimming. Its recreational potential will be enhanced by baseball diamonds, tennis courts, and picnic areas along the shore.

The floodwater management study was started in 1971, after the Metropolitan Sanitary District of Greater Chicago requested a cooperative river basin study of the six watersheds draining into the Chicago area. SCS led the study, which also involved USDA's Forest Service and Economic Research Service, the MSDGC, and the State of Illinois.

Voluntary steering committees represented soil and water conservation districts, municipalities, and citizens' groups in each watershed. Each committee organized neighborhood meetings to coordinate the planning efforts of government agencies with the needs and desires of local citizens.

The steering committees helped resolve conflicts between various agencies and interest groups, solicited comments from individuals and businesses, and held public hearings on the floodwater management study once a draft was written and circulated.

Each watershed plan was made separately; then all were integrated to form the final floodwater management plans for the entire area, which includes parts of five counties in northeastern Illinois, two counties in southeastern Wisconsin, and one county in northern Indiana.

At last summer's dedication, Assistant Secretary Robert W. Long characterized the plan as unique because it cut across economic, legal, and political lines to deal with a regional problem.

Robert W. Long, Assistant Secretary of Agriculture for Conservation, Research and Education.

Existing federal, state, and local programs affecting flood control were integrated into the plans through close cooperation among governmental units, the steering committees, and the public. For example, MSDGC's Tunnel and Reservoir Plan for collecting sewer overflow will store all the rain that falls on built-up areas. After a storm, the stored water will be pumped back through treatment plants before it is discharged into watercourses.

SCS helped prepare the floodwater management study under Section 6 of P.L. 566, the Watershed Protection and Flood Prevention Act, as amended. MSDGC and SCS shared the $2.9 million cost.

Because of its scope and the extensive public participation, the Chicago metropolitan area floodwater management study is attracting national attention. At last summer's dedication ceremony, Robert W. Long, Assistant Secretary of Agriculture, characterized it as unique because it cut across economic, legal, and political lines to deal with a regional problem.

As principal sponsor of the study, MSDGC received a 1976 Merit Award from the Soil Conservation Society of America. Tom Hamilton, chairman of the Chicago Metropolitan River Basin Council of Steering Committees, was named "Watershed Man of the Year" for 1976 by the National Watershed Congress. And for completing the study on schedule and within the budget, the SCS river basin planning staff headquartered at Lisle, Illinois, received merit awards from SCS.

Four members of the SCS river basin planning staff have been assigned to the MSDGC for 2 years under the Intergovernmental Personnel Act to help implement the plan.

Construction has already started on one of the six watersheds, the Upper Salt Creek, under SCS's Small Watershed Program. Sponsors of another watershed plan have also applied to SCS for financial assistance.

Of the remainder, the U.S. Army Corps of Engineers has been requested by Congress to implement one, and state and local government funding is planned for those requiring mainly nonstructural flood control measures.

The total installation cost for implementing the floodwater management plans is projected at $200 million. But sponsors agree that flood control in this area of 7.5 million people is well worth the cost.

The Days After Teton

The Teton Dam disaster touched most federal agencies in some way—and the Soil Conservation Service was no exception. The Bureau of Reclamation dam failed on Saturday, June 5, 1976. Richard J. Gooby, SCS area conservationist, Pocatello, Idaho, gives his personal account of the devastating flood and the events that followed.

No one yet knows precisely what caused the Teton Dam to collapse.

The answer is expected to come from the two teams conducting investigations.

SCS is part of the Department of the Interior Teton Dam Failure Review Group, serving with the U.S. Army Corps of Engineers, U.S. Geological Survey, the Tennessee Valley Authority, and the Bureau of Reclamation.

Nine engineers and geologists were also appointed by the Secretary of the Interior and the Governor of Idaho to the Independent Panel To Review Cause of Teton Dam Failure.

June 5, 11:57 a.m.: Teton Dam collapsed, spewing 250,000 acre-feet of water along a 100-mile stretch of Teton and Snake Rivers.

Raging water, up to 60 feet deep, ripped through Madison, Jefferson, Bonneville, Fremont, and Bingham Counties—destroying homes, offices, equipment, animals, crops, and lush farmland.

I had been archery-fishing and learned about the disaster when I arrived home at 7 p.m. I was greeted with the news that Rexburg was under water, and the flood crest was working its way to Idaho Falls. SCS has field offices in both towns. I tried to telephone the district conservationists, but phone service was out.

June 6: I headed for Rexburg early this morning to check on our people and the office. The water has subsided, leaving the town in a sea of mud and debris.

In town, I passed an SCS pickup wrapped around a light pole; farther down the street, another SCS rig had ended up in a store window. Four SCS vehicles are damaged beyond repair.

The field office is still standing, but its contents have been thoroughly rearranged. Six feet of water entered through the back door and left by the front door, dumping 4 inches of silt and wrecking furniture and files. A 5-pound carp was lying in the middle of the floor.

Crews began clearing the Rexburg office, the only SCS office damaged in the five-county disaster area.

All SCS personnel are accounted for except Jerry Pickett, district conservationist. We tried to get out to his home about 6 miles from Rexburg, but bridges are out. With no phone service, there is no possible way to find out if he and his family have made it safely through the flood.

Farther downstream, Blackfoot, Shelley, and Firth residents are preparing for the flood crest. Roberts suffered heavy damage.

President Ford has declared eastern Idaho a national disaster area.

June 7: Phone service was still not restored.

I tried to get into the flooded cropland area, but roads are washed out. Travel is impossible.

Bank stabilization work done early last spring along the Snake River near Blackfoot has been severely tested: all of the rock riprapped banks were overtopped by several feet of water. Even though damaged, these measures, authorized under Section 216 of the Flood Control Act of 1950, were effective in minimizing bank erosion.

June 8: We were relieved to see Jerry Pickett, who finally managed to make his way into Rexburg. He and his family are all okay.

June 9: Amos Garrison, SCS state conservationist, and Creighton Gilbert, SCS assistant state conservationist for water resources, flew to Idaho Falls with the State Defense Committee and John Knebel, Under Secretary of Agriculture. We met with the Federal Disaster

Assistance Administration (FDAA), U.S. Department of Housing and Urban Development, about a mission assignment for SCS. FDAA heads the federal disaster assistance program.

June 10: FDAA mission assignments finalized. SCS is to contract for debris removal from private farm property and restore on-farm irrigation systems where salvageable crops exist.

We estimated that 940 farms and rural residences will be involved. Damage survey reports will have to be made for each to determine immediate emergency work needed, as well as permanent work to be done later under Emergency Conservation Measures.

Authorizations for debris removal will have to be signed by property owners before contracted clean-up work can begin. The Agricultural Stabilization and Conservation Service agreed to match SCS personnel with an equal number of its people to obtain the needed damage survey reports and landowner signatures. Twenty crews were set up to do the work.

We flew by helicopter over the flooded area. Approximately 128,000 acres have been flooded. More than 300,000 acres of irrigated land, untouched by the flood, are without water because of damage to irrigation canal systems. The Bureau of Reclamation received an FDAA assignment to repair canal systems. The Corps of Engineers' assignment is to repair dikes, cut off overland flow of water, and clean debris from cities.

FDAA service centers have been set up in four of the counties to aid disaster victims. SCS has employees at the centers 7 days a week. I will be attending daily meetings with representatives from all federal agencies involved to give FDAA up-to-the-minute reports on mission assignments. The meetings will provide the opportunity to iron out any problems encountered as the clean-up work progresses.

SCS state conservationists in Oregon, Wyoming, and Utah offered to send employees to assist us.

Photos on this and facing page indicate the devastating results of the collapse.

In town, I passed an SCS pickup wrapped around a light pole; farther down the street, another SCS rig had ended up in a store window. Four SCS vehicles are damaged beyond repair.

SCS's immediate assignment was to contract for debris removal from private farm property and restore onfarm irrigation systems where salvageable crops existed. Emphasis now is on river channel work to reduce flooding next spring. The capacity of the Teton River is half what it was before June 5.

June 14: Thirteen Idaho SCSers were detailed into the area to help our 35 SCS employees. We worked Saturday and Sunday, and no one remembers what an 8-hour working day is.

June 16: We've estimated that damaged farmland will be up to only 65 percent of normal production this year, and as many as 10,000 acres of farmland could have been permanently destroyed. Much of the topsoil has been stripped away, leaving only a gravel surface.

June 21: Ten SCS employees from Oregon, Wyoming, and Utah arrived to assist with damage survey reports and serve as contract inspectors for the debris removal work.

June 22: We received authorization from the Administrator of SCS to use $1.5 million of emergency assistance funds in the damaged area. The proposed emergency work will be clearing, snagging, and removing gravel bars from approximately 20 river miles and placing rock riprap at selected sites.

The Corps of Engineers will arrange for installation of these Section 216 measures on a reimbursable basis. They already have engineers and contractors mobilized in the area, which will save time and money for the government.

June 24: FDAA amended our mission assignment regarding reimbursement, increasing it from $1 million to $2.8 million. It enlarged the SCS mission assignment to include removal of large debris from all rural lands.

June 25: A debris contractor turned over a railroad boxcar. Two cows and a bull walked out; they had been in there 20 days.

July 2: FDAA again amended the reimbursement amount for costs incurred, increasing it to $4.7 million. Work should be completed no later than early September.

The period of emergency work is about over, but there will be years of work ahead requiring SCS technical assistance—land leveling, planning irrigation systems, deep plowing . . .

July 6: SCS continued debris cleanup work. Over $3.5 million in contracts have been let. Some trucks are hauling 35 to 40 loads of debris per day.

July 23: FDAA again amended the reimbursement amount, increasing it to $6.7 million.

July 25: All but 2 percent of the irrigated farmland affected by the dam collapse is getting water again, according to Bureau of Reclamation officials.

July 26: The period of emergency work is about over, but there will be years of work ahead requiring SCS technical assistance—land leveling, planning irrigation systems, deep plowing, etc.

August 3: SCS state conservationists from California, Washington, and Oklahoma have agreed to send personnel to assist in the cleanup effort.

August 9: Madison and Fremont Counties have let contracts under the Section 216 program to remove large debris from the Teton River. The debris includes vehicles, farm machinery, and even a schoolbus.

August 11: The United States Army received a mission assignment to bring in a Chinook helicopter to help us remove debris from areas accessible only by air. We flew the area and counted 52 propane tanks, hundreds of barrels, along with vehicles and machinery. The helicopter can lift 12,000 pounds.

September 1: The helicopter has removed nearly all the debris in its assigned 3-acre area. Some days it hauled nearly 170,000 pounds.

September 3: All the FDAA debris removal contracts were shut down today. Some debris in set areas will have to wait until late fall before it's dry enough to be removed.

September 7: There is a tremendous emergency cost-share workload under ASCS in the five counties. We will be up to our ears in requests for a long time.

September 8: SCS received an advance from FDAA for $3,060,000 to perform the needed river channel work this fall so flooding will be reduced next spring. The river's capacity is half what it was before June 5. The Corps of Engineers started today to remove gravel from the south fork of the Teton River under a continuation of the arrangement with SCS. Plans are nearly completed for all the river work.

Some of the area will never be restored. We have documented damages with many photos, both from the air and on the ground. Some of the damage is almost beyond comprehension in the most severely affected areas.

Collapse of the earth-fill dam, which was filling for the first time this spring, has been reported as one of the worst dam disasters in world history in terms of property damage. By comparison, it was miraculous that only 11 persons lost their lives.

Over 3,300 residences were destroyed or damaged. A number of farm families have not located even a small portion of their homes or belongings.

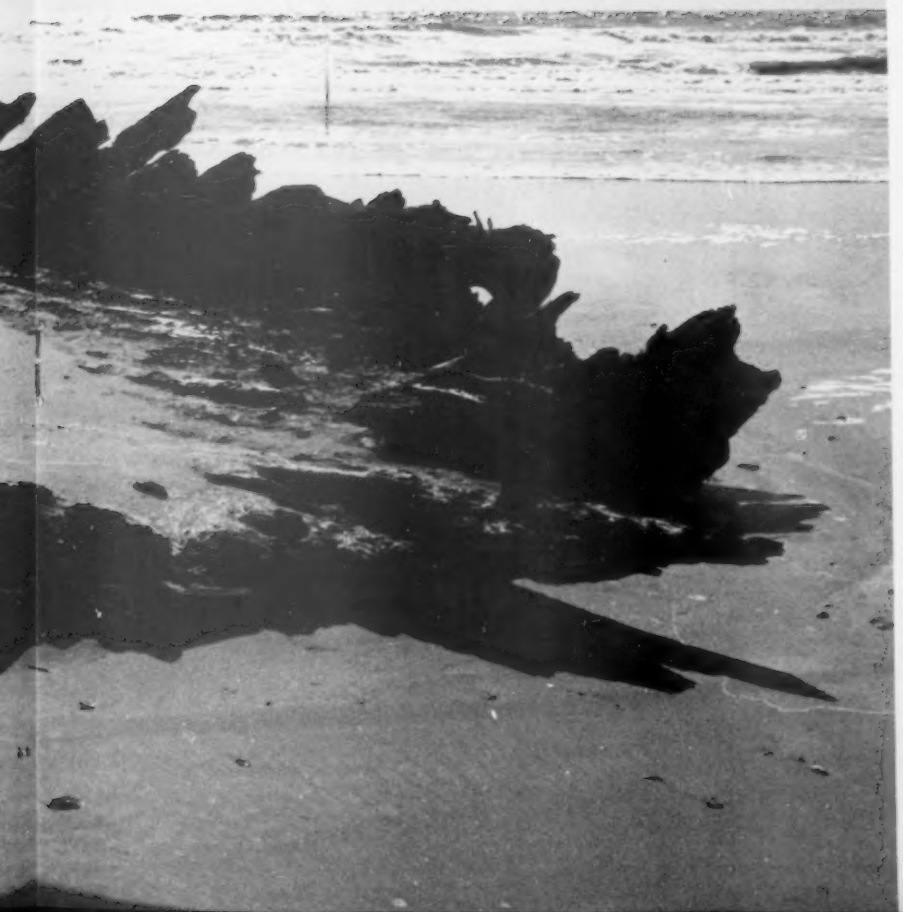
Wilbert Trupp, Yellowstone Soil Conservation District supervisor, has a single birch tree left to identify what used to be his farmstead.

LIBRARY
EASTERN MICHIGAN UNIVERSITY
YPSILANTI
U. S. DEPOSITORY DOCUMENT

by Anne Zack

Preserving Virginia's Barrier Islands

Carried with the ocean waves, migrant sands bury the enduring remnants of man's intrusion. Conservationists monitor nature's return to sovereignty over this Virginia island chain.



Leaning forward in his rocking chair on the veranda of the Wachapreague Hotel, the innkeeper pointed beyond the marina, across the maze of marsh grass and water, to a long dark streak on the horizon.

"That's Parramore Island. All that's left there is a wrecked ship's hull and the Coast Guard station," he said. "Off to the north is Cedar Island. There's nothing there but some summer cottages and an old car somebody ferried out to the island and then just abandoned it on the beach."

There's not much left on any of Virginia's barrier islands—not much man created, that is. The Nature Conservancy intends to keep it that way.

Since 1951, the nonprofit Conservancy has acquired and preserved important natural lands in 48 states, Canada, and the Caribbean. The Conservancy is a privately funded corporation with membership open to the public. It is involved in nearly 1,500 preservation projects—from tropical rain forests in Hawaii to Adirondack trout lakes.

"The Soil Conservation Service has teamed up with the Conservancy on several hundred projects, and our people are closely involved with the local conservation districts," said Ray Culter, head of Land Stewardship for the Conservancy. "Since 1973, SCS has made detailed soil surveys of 80 projects for us."

SCS and district people have helped The Nature Conservancy identify natural areas that should be preserved, such as a cypress swamp near Charleston, South Carolina. They also have helped the Conservancy plan management of projects, setting up a grazing plan for a wildlife range south of Albuquerque, New Mexico, for example.

The barrier islands project involves a 42-mile chain of nine islands along the Delmarva Peninsula, which Virginians call the Eastern Shore. The Virginia islands are the only undeveloped chain of barrier islands along the nation's East Coast.

"We became interested in the islands during the late 1960's," said Rod Hennessey, director of the Con-

Rod Hennessey, director of The Nature Conservancy's Virginia Coast Reserve, ties up at an old dock on the marsh side of Parramore Island.

servancy's Virginia Coast Reserve. "Developers wanted to build a major resort center here and have the state construct a bridge to connect the islands to the Eastern Shore."

The organization purchased 33,000 acres, more than half the land on the islands, for $4.5 million, according to Hennessey. "Now we have a say in plans for all nine of the islands—from Metomkin Island south to Smith Island, near the Chesapeake Bay bridge-tunnel."

The esthetic value of preserving islands is obvious, but The Nature Conservancy has other reasons as well. This area where land meets sea and saltwater meets freshwater is one of the richest ecosystems in the world. Almost all the finfish and shellfish harvested by the Eastern Shore's $7-million-a-year seafood industry depend on coastal wetlands like these at least part of their lives. Oysters, clams, and crabs spend their entire lives in the marsh estuary system, feeding off particles of deteriorating marsh grass.

The rich aquatic life of the coastal wetlands and dunes provides excellent feeding, resting, and nesting areas for well over 200 species of waterfowl and shorebirds. The marshes are the state's only breeding sites for the Forester's tern, willet, and laughing gull. Royal terns summer on Virginia's barrier islands and winter in Peru. Canada geese and a variety of ducks winter here and summer farther north.

Once the land was purchased, the Conservancy launched the 2-year Virginia Coast Reserve Study to determine the best way to manage it. One part of the study covered legal aspects of acquiring land; another part detailed social and economic effects of management alternatives on the communities of the Eastern Shore. A third part, a volume 3 inches thick, documented the ecological value of the islands.

The Nature Conservancy asked SCS to conduct a detailed soil survey

The building and tearing away of the barrier islands continue today. At left, American beachgrass is the first plant to take hold on the northern end of Parramore Island, which is building with deposition from the southern end of Cedar Island. Above, a forest once on the interior of the island was exposed when protecting frontal dunes were eroded; it is now a "ghost forest." At right, amongst the dead trees, salt-tolerant grasses maintain their foothold and slow erosion.

Photos by Don Schuhart.

Besides the obvious esthetic value of the islands, this area where land meets sea, and saltwater meets freshwater, is one of the richest ecosystems in the world.

and vegetation study for the Virginia Coast Reserve Study. The soil survey and vegetation study are part of an inventory of the island resources and are being used to plan management of the islands as well.

Louis Cullipher, SCS soil scientist, strolled along the beaches, crawled through waxmyrtle thickets, and sloshed through marshes sidestepping snakes and slapping at mosquitoes as he sampled the island soils and drew their boundaries on black-and-white aerial photographs. He then used color infrared photographs from the National Aeronautics and Space Administration to correlate soils information with vegetation data.

The vegetation on the islands varies from a few sprigs of salt-tolerant grass along the sea to a maritime forest of 80-year-old pines on the relict back dunes of Parramore, the largest of the islands. The type of vegetation depends on salt spray, frequency of overwash, protection by dunes, and soil wetness. Only grass grows on the excessively drained soils; both grass and shrubs grow on the wetter soils.

"There are two kinds of 'ghost forests' on Parramore and some of the other islands," said Cullipher. "Changes in the water table have killed redcedars on the marsh side. On the ocean side, erosion has eaten away at the beach, and the salt spray has killed trees that were once protected by sand dunes and shrubs."

Cullipher said the ghost forests and traces of marsh soils on the beaches are evidence that the islands are continually creeping westward.

The islands "move" because of prevailing winds and ocean currents. Wind picks up the dry sand easily, building dunes in some places and eroding them in others.

Ocean waves also move the islands westward. In summer when wave action is strong, beaches retreat as the waves tear sand away. In winter when wave action is milder, the beaches build up somewhat as sand accumulates, thus maintaining a fragile balance.

Although the westward movement is generally inch-by-inch, it can be dramatic. During the "Ash Wednesday Storm" of 1962, for instance, wind and waves moved Metomkin Island several hundred feet west in a few hours.

The islands move northward as well as to the west. Waves break on the beaches at an angle, creating a longshore current, or littoral drift, parallel to the beach. The southward current picks up sand from the south end of one island and deposits it on the north end of the next. The islands work together in the chain. If a jetty or some other permanent structure is used to stop

erosion on one island, the next island south is robbed of deposition and erodes away much faster.

"That's one reason The Nature Conservancy opposed developing the barrier islands," Hennessey explained. "Development won't stop the islands from moving, and in the end, damage caused by the gradual movement and storms could cost more than the income a resort would generate to the area."

Although some Conservancy holdings are leased, sold, or donated to government agencies, universities, or sister conservation organizations for preservation, the Conservancy will keep and manage the barrier islands itself.

"Based on the resource study, the board of directors decides whether to keep a project and how to manage it. It generally just says 'keep it natural.' Our professional staff uses the study to decide exactly how to go about doing so," Hennessey said.

The first objective for the barrier islands is to return them to their natural state. The Conservancy has asked Eastern Shore people to remove their cattle and sheep, which graze on the islands. It also is eliminating game animals introduced by hunting clubs of the late 19th and early 20th centuries.

The current picks up sand from the south end of one island and deposits it on the north end of the next. In this way, the islands work together in the chain.

"For example," said Hennessey, "there are a lot of black-tailed jackrabbits from Kansas here, and who knows how we'll get rid of them!"

The Conservancy also anticipates a few problems with some of the animals native to the islands. The deer herd on Parramore Island, for instance, is overbrowsing the plants, stripping foliage from greenbriar, grape, and redcedar up to a height of 4½ feet, according to Cullipher.

"We've done some limited harvesting of the deer," said Hennessey, "but herds naturally go through a boom-bust population cycle. The current theory in wildlife management is that since this area has little interference by man, the vegetation will adjust and the herd will regulate itself through the boom-bust cycle."

Eventually, the Conservancy will use the barrier islands for research and education. Here, scientists and college students will be able to study all aspects of natural coastal systems at work—geology, soils, vegetation, and wildlife. Old Dominion College of Norfolk, Virginia, has already approached the Conservancy about starting a barrier islands research station.

"We're also considering some public daytime recreation use of the islands, where it won't destroy the beaches and bird colonies," Hennessey added.

Cullipher interpreted the soil survey information for several uses, including sanitary facilities, roads,

Above: American beachgrass is a "natural" in the formation of sand dunes. It traps blowing sand and, as on the northern end of Parramore Island, begins to form a new line of frontal dunes.

At right: Saltgrass marsh extends from the barrier islands to Virginia's Eastern Shore (top photo). A freshwater marsh on the interior of Parramore Island is bordered by 80-year-old pines on relict dunes (bottom photo).

small buildings, source material, water management, and recreation. For instance, he pointed out that vehicles would destroy vegetation that holds the loose beach sand in place and create a wind erosion problem. In the interior marsh areas, vehicles would compact the soil and cause water to pond.

"We also plan to use the soil survey to help define ecologically sensitive areas. We'll combine it with geological and biological data to make sensitive area maps," Hennessey said.

On the barrier islands, as on The Nature Conservancy's other projects, however, preserving the natural environment outweighs man's using the land. By keeping them natural, the Conservancy hopes these islands will continue to provide a haven for wildlife and protection for the rich marshlands that support the Eastern Shore economy.

Ms. Zack is a staff writer, SCS, Information Division, Washington, D.C.

SCS soil scientist Louis Cullipher takes a sample of Newhan sand on the northern end of Parramore Island.

At right: Tracks of white-tailed deer on Parramore Island, where the herd is overbrowsing on plants such as greenbriar, redcedar, and grape (top photo). Shorebirds are abundant on the islands, where they chase receding waves to pick out mussels and other food before the next breaker can catch them.

Yesterday's Barrier Islands

by Maria Ann Graham

Virginia's barrier islands look much as they did 400 years ago, when the Matchipungo Indians of the Eastern Shore canoed across Broadwater Bay to harvest clams and oysters on them. But the islands have seen plenty of action between then and now.

The Eastern Shore of Virginia was one of the first areas settled in the New World, and throughout the 17th century its population swelled with tobacco and cattle farmers. By the second half of the century, the farmers discovered they could release cattle on the barrier islands to forage and reproduce untended. One after another, the islands were used mainly for grazing for the next 100 years.

Although a few settlers ventured to Hog Island shortly after the Revolutionary War, Cobb Island was the center of activity during the 19th century. Nathan Cobb, a Massachusetts shipbuilder, bought the island and moved his family there, salvaging ships wrecked on the shifting shoals.

Island settlers always had lived by collecting eggs in spring, fishing in summer, and hunting in fall and winter, but Cobb and his sons were the first market hunters. They killed ducks by the hundreds, packed them in barrels, and shipped them to the finest hotels of New York and Philadelphia.

By the late 1800's, Cobb Island itself was the site of a lucrative hotel business, hosting wealthy mainlanders who came to hunt, fish, and swim. But a series of storms pounded the coast, and by 1897 the resort was gone.

Meanwhile, small settlements, hotels, and lifesaving stations sprang up on the other barrier islands.

In the late 19th and early 20th centuries, lavish hunt clubs were established on several of the islands by rich businessmen who wanted retreats. Grover Cleveland was a frequent visitor, among other famous people.

Sport hunting boomed, and market hunting continued unchecked until it was outlawed in the early 1900's, only to be replaced by illegal duck trapping. To improve shooting, the hunt clubs controlled natural predators and stocked game, often exotic forms.

Storms continued to shift the island sand, reform the marshes, and undermine the elegant club houses. The great hurricane of 1933 and the Depression finally brought the hunt club era to an end.

Island settlements met a similar fate. By 1930, for example, 40 or 50 homes, a school, and a church nestled in a pine wood formed the village of Broadwater on Hog Island. The sea had inched closer and closer for years, but the village's destruction came in 1933, when the hurricane submerged the island and forced its inhabitants to float their houses and belongings to the mainland on barges. By the 1950's, the sea was lapping at the gravestones in the village churchyard. Today, not a trace remains of the village or the pine woods.

Ms. Graham is a freelance writer. This article is condensed from historical research she prepared for The Nature Conservancy's Virginia Coast Reserve Study.

Once, the lifesaving crew could rush out onto a boat ramp to launch rescue operations. Today, the sand has built up and the ramp is 150 feet from the high tide line.

Photo courtesy of Kellman Doughty.

A hunter and his decoys mark the barrier islands of another century. Hunting—legal and illegal, for sport and for market—boomed on the islands for many years.

Each of the nation's nearly 3,000 soil conservation districts has challenges before it that are unique. On the West Coast, the Pacific Conservation District is battling erosion and sediment to protect a special "cropland"—the estuaries and tidelands surrounding Willapa Bay.

Consider the Oyster

by Bernhardt Rufener
and Richard Murakami

The Pacific Conservation District in southwest Washington has a variety of farming activities going on within its boundaries: raising beef and dairy cattle, managing and harvesting woodlands, growing cranberries in bogs.

But perhaps the most unusual is oyster farming.

This important crop brings $5 million a year in income to an economically depressed area.

Soil conservation is critical to the industry, which depends on silt-free water and sediment-free oyster beds. Keeping soil in place up in the watersheds is a must.

Oysters are filter feeders and require nutrients in solution as provided in the normal flow of a stream into an estuary. Anything more than normal sedimentation will destroy the oyster beds.

The district tries to keep unusual amounts of sediment out of the streams by better management of logged-over forested areas, stream-bank stabilization on the rivers

The industry depends on silt-free water and sediment-free oyster beds . . . Anything more than normal sedimentation smothers the oysters. Sediment has the same effect on oyster beds that windblown soil has on crops like alfalfa.

At far left, an oyster bed at low tide in Willapa Harbor. Oysters are harvested at high tide with hydraulic or power dredges. Control of soil erosion—and resulting sediment—is critical to the oyster industry.

that have high velocities of water during the winter, and establishment of permanent vegetative cover on critical areas.

The sediment, with its agricultural, residential, industrial, and chemical wastes, is carried by six rivers and their tributaries to the estuaries and tidelands surrounding Willapa Bay, where the oysters are grown.

It covers the oysters, and, in effect, smothers them. It has the same effect on oyster beds that windblown soil has on crops like alfalfa.

The district's concerns are dealt with by use of the Agriculture Conservation Program (ACP) and the Forestry Incentive Program (FIP) managed by USDA's Agricultural Stabilization and Conservation Service. The Cooperative Extension Service, Soil Conservation Service, and State Department of Natural Resources provide expertise.

Through the Forestry Incentive Program, woodland owners get financial help in revegetating logged-over lands with the technical assistance of the State Department of Natural Resources.

Critical areas on river banks and on road cuts and residential and industrial construction sites are given prompt attention by SCS technicians.

In Pacific County, oyster farming uses about 28,000 acres of tidelands.

Seed oysters—known as spat—are caught by suspending old oyster shells in the tidal currents. The spat attach themselves to shells where they continue to grow. Seed oysters are also imported from Japan and Korea.

The seed oysters are planted in parallel rows in tidelands. Planting areas are staked in rows far enough apart to permit a boat to pass through to scatter seed oysters evenly in the bed.

The seed oysters require little attention the first year after planting.

After that, they must be cultivated regularly to keep proper distribution and break up clusters of shells. A spike-tooth harrow, similar to a huge rake, is used, pulled by hand at low tide or by tugboat at high tide.

Predatory enemies, such as burrowing shrimp, are controlled to keep the oyster beds in high production.

In about 2 years the oysters are transplanted to fattening beds closer to the mouth of the bay where food is more plentiful and water cleaner.

Oysters are harvested with hydraulic or power dredges—scow-like structures with hoisting engines that manipulate dredge bags over the beds at high tide. An average oyster dredge operation can harvest about 1,000 bushels of oysters per tide, using one operator and one deck hand.

The oyster crop is then delivered to processing plants to be marketed fresh-chilled or steam-cooked in cans.

Mr. Rufener is SCS district conservationist, Raymond, Washington.
Mr. Murakami is Washington Division Manager, Coast Oyster Company, South Bend, Washington.

Title X Teamwork

by Robert K. Kissler

A lot of work needed doing . . . and a lot of people were unemployed. That combination—and Title X, the Job Opportunities Program authorized by Congress—has made its mark in Ohio, where more than 250 people have been hired to work on projects recommended by soil and water conservation districts.

They're leaving a lasting mark in Ohio.

They're doing everything from renovating county fairgrounds to cleaning up streams in a program that's providing temporary employment and training for them . . . and needed improvements for local areas.

They've been hired through Title X, the Job Opportunities Program authorized under the Emergency Jobs and Unemployment Assistance Act of 1974. More than 250 people have been hired under the program in nine Ohio counties—some of which had unemployment rates as high as 19 percent.

"The program really benefits counties," said Robert Kunkle, Williams County commissioner. "It allows local people to move ahead on valuable projects without a lot of outside restrictions."

The counties have received nearly $1.2 million for the program from the U.S. Department of Commerce through the Soil Conservation Service. In each county, the board of commissioners administers the funds for projects recommended by local soil and water conservation districts.

The Ohio counties are using Title X funds to improve public areas, building fireplaces and picnic shelters in parks, for example, and to do basic conservation work.

Title X workers have cleared debris from more than 150 miles of streams to improve drainage and reduce streambank erosion and flooding. In Darke County, they cleared more than 60 miles of streams and drainage ditches. The county plans to continue maintenance and improvements after the Title X program ends in December.

Canoeists along the St. Joseph River in Williams County can also testify to the value of Title X work. They're able to paddle through long stretches of the river for the first time in years—thanks to the removal of log jams by the workers.

Another priority project has been the seeding of critically eroding areas. More than 110 acres of roadbanks and ditches were seeded to tall fescue in Hocking County. In addition, brush was cleared from 61 miles of rural roadbanks to improve visibility.

Several counties have used Title X to improve school grounds by seeding and mulching eroding areas and installing drainage structures.

Just east of the town of Logan, workers concentrated on a 40-acre Land Lab operated by the local school district for teachers and students. They handled jobs too difficult or dangerous for students, such as clearcutting 2 acres for a study of plant succession and selectively harvesting trees.

Management of Title X workers differs from most business situations, commented Arch Hood, Title X supervisor for Holmes County. "We don't want to keep the best men on the job," he said.

In fact, two potential employees never made it: Hood helped them find permanent jobs before Title X work began in the county. Hood schedules work so that employees have time to apply for permanent employment.

Title X projects are supervised by a foreman chosen from the work crew. Conservation district supervisors check the work, and SCS personnel provide technical assistance.

"It's a blessing to receive an outright grant that allows us to improve the employment situation in the county," summed up Otto Shaw, president of the Board of County Commissioners for Hocking County.

"And solving erosion problems and making environmental improvements turn the temporary program into one with permanent benefits for everyone."

Mr. Kissler is SCS public information officer, Columbus, Ohio.

New Publications

Soil Taxonomy
By the Soil Survey Staff, Soil Conservation Service, U.S. Department of Agriculture. 1975. 754 pp., illus. Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. $17.50 domestic, $21.88 foreign.

A milestone in soil science, *Soil Taxonomy* sets forth a basic system of soil classification for making and interpreting soil surveys. It is designed for use by soil scientists.

The 754-page book was prepared by the Soil Survey Staff, Soil Conservation Service. Authors include soil scientists from USDA, land grant universities, and many foreign countries. The classification in *Soil Taxonomy* was adopted for use in the United States in 1965. The complete text has undergone little change since an abridged text was given limited distribution in 1973.

The first six chapters present general principles and concepts; the next chapters discuss each of the 10 orders; and the remaining four chapters discuss family and series, application to soil surveys, soils of the United States, and relation to other taxonomies.

The Face of Rural America. The 1976 Yearbook of Agriculture. U.S. Department of Agriculture. 288 pp., illus. Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. $7.30.

In this Bicentennial year, *The 1976 Yearbook of Agriculture* has departed from tradition.

For the first time since the series started in 1894, the yearbook consists entirely of photographs and captions. Depicting American agriculture in 1976, *The Face of Rural America* features 335 illustrations by more than 50 photographers. In addition, it has departed from its 6-by-8-inch format to a larger 8½-by-11-inch size.

The 288-page hardcover book is available for $7.30 from government bookstores or from the Government Printing Office. Members of Congress also have a limited supply for free distribution to constituents.

Meetings

October

14–17	National Association of Biology Teachers, Inc., Denver, Colo.
17–20	American Forestry Association, Disney World, Fla.
17–21	National Recreation and Park Association, Boston, Mass.
18	Conservation and Research Foundation Annual Meeting, Boston, Mass.
18–20	American Plywood Association Industry Meeting, Biloxi, Miss.
21–23	Seventh Technical Conference on Irrigation, Drainage and Flood Control, Spokane, Wash.
23–27	National Environmental Sanitation and Maintenance Educational Conference and Exposition, Boston, Mass.
28–29	American Association for Vocational Materials, Atlanta, Ga.
29–Nov. 1	Forty-Second Annual Convention, National Junior Horticultural Association, King of Prussia, Pa.

November

7–10	National Forest Products Association, Scottsdale, Ariz.
7–10	Sprinkler Irrigation Association Convention, Newport Beach, Calif.
8–9	Fifteenth Annual Purdue Air Quality Conference and Exhibition, Indianapolis, Ind.
8–11	Geological Society of America, Denver, Colo.
8–15	The National Grange 110th Annual Session, Atlantic City, N.J.
9–12	Future Farmers of America, Kansas City, Mo.
14–17	National Agricultural Bankers Conference, New Orleans, La.
14–17	National Association of State Universities and Land Grant Colleges, Washington, D.C.
14–18	National Association of State Departments of Agriculture, Phoenix, Ariz.
15–17	American Association of State Highway Officials and Transportation Officials, Birmingham, Ala.
16	American Seed Trade Association, Inc., Kansas City, Mo.
18–22	Adult Education Association of the U.S.A., New York, N.Y.
24–27	National Council for Geographic Education, San Francisco, Calif.
28–30	American Society of Farm Managers and Rural Appraisers, St. Louis, Mo.
28–Dec. 1	World Wildlife Fund Fourth International Congress, San Francisco, Calif.
28–Dec. 2	American Institute of Chemical Engineers, Chicago, Ill.
28–Dec. 3	American Society of Agronomy, Crops Science Society of America, and Soil Science Society of America Joint Annual Meeting, Houston, Tex.
30–Dec. 3	Western Forestry Conference, Portland, Oreg.

Moving? Send present mailing label and
new address including zip code to: Soil Conservation Service
U.S. Department of Agriculture
Room 6116
Washington, D.C. 20250

United States Department of Agriculture
Washington, D.C. 20250

Controlled Circulation Postage
Paid in Washington, D.C.

AGR 101

Official Business
Penalty for private use, $300

*U.S. GOVERNMENT PRINTING OFFICE: 1976 211-413/14 1-3